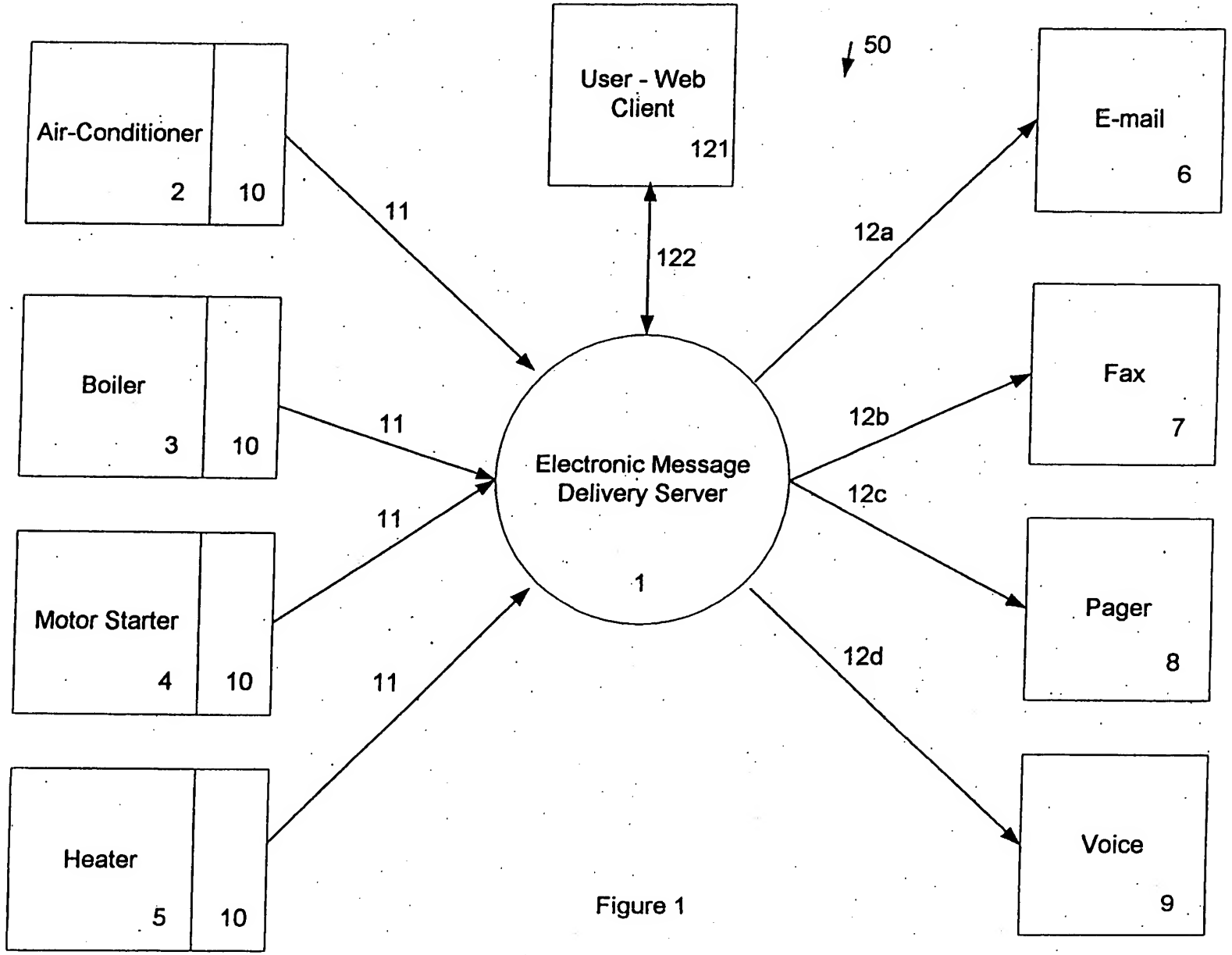
Air-Conditioner
2
10
Boiler
3
10
Motor Starter
4
10
Heater
5
10
11
11
11
11
User - Web Client
121
122
Electronic Message Delivery Server
1
50
12a
12b
12c
12d
E-mail
6
Fax
7
Pager
8
Voice
9

Figure 1

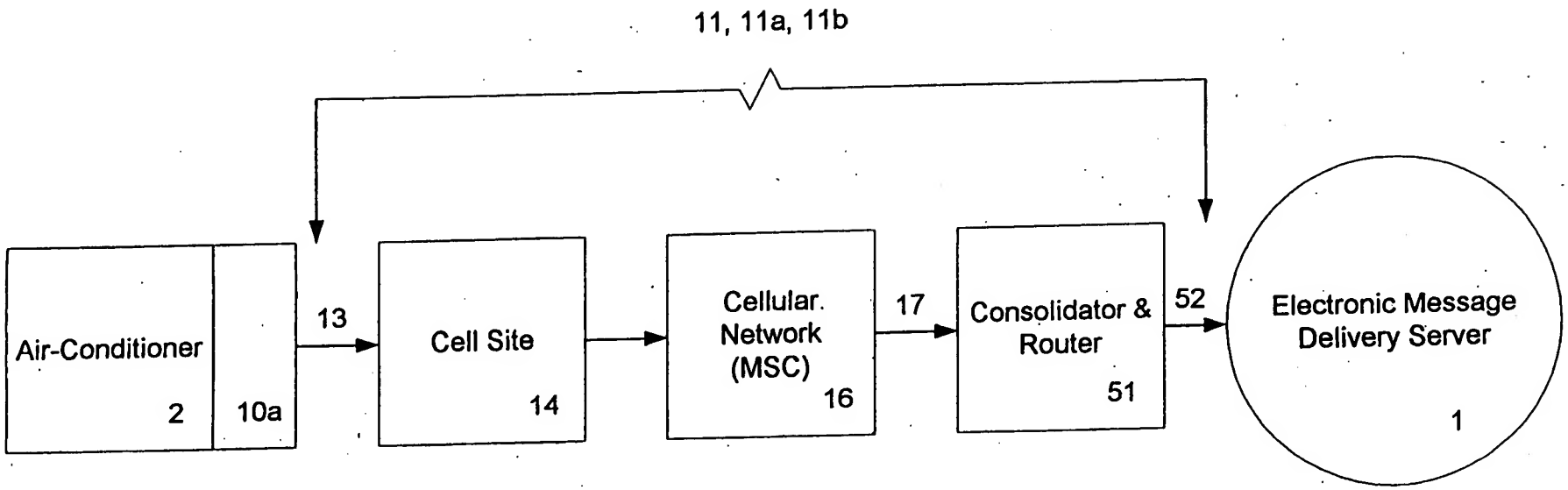
11, 11a, 11b
Air-Conditioner
2
10a
13
Cell Site
14
Cellular Network (MSC)
16
17
Consolidator & Router
51
52
Electronic Message Delivery Server
1

Figure 2

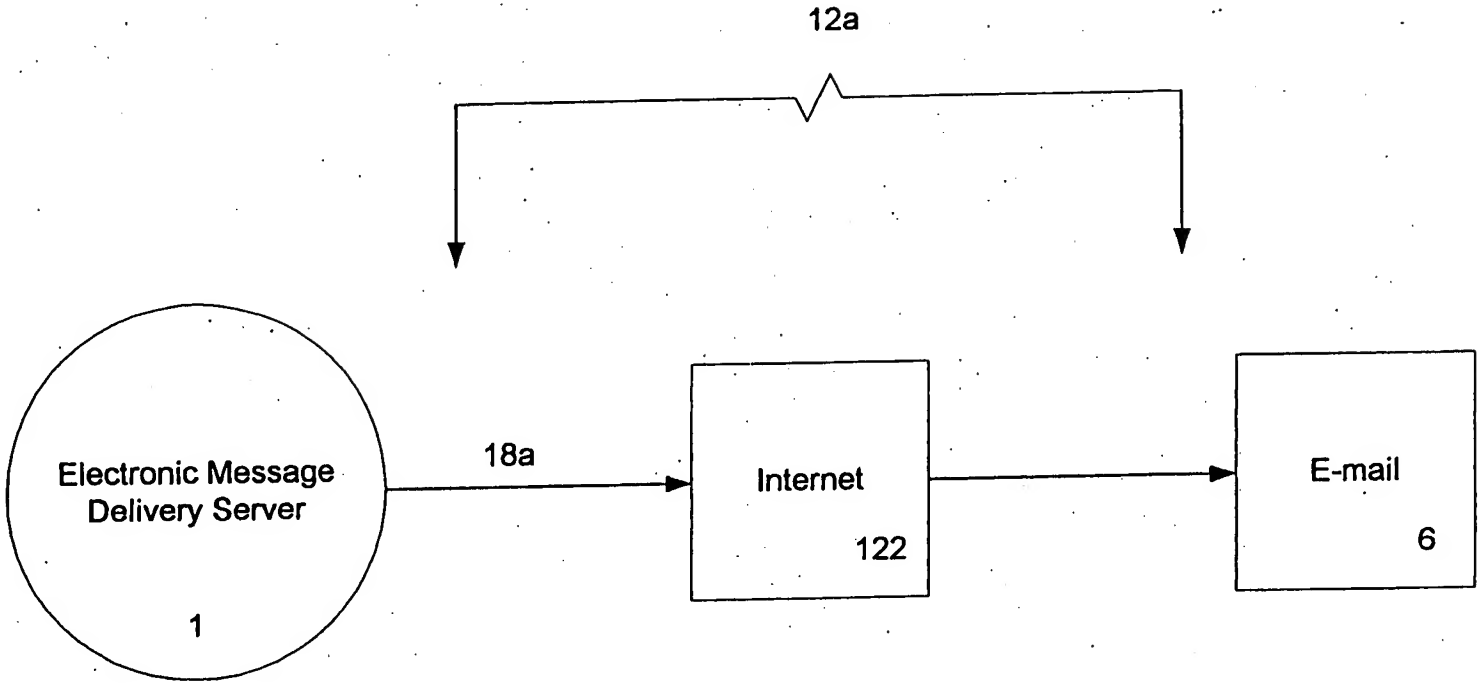
12a
Electronic Message
Delivery Server
1
18a
Internet
122
E-mail
6

Figure 3a

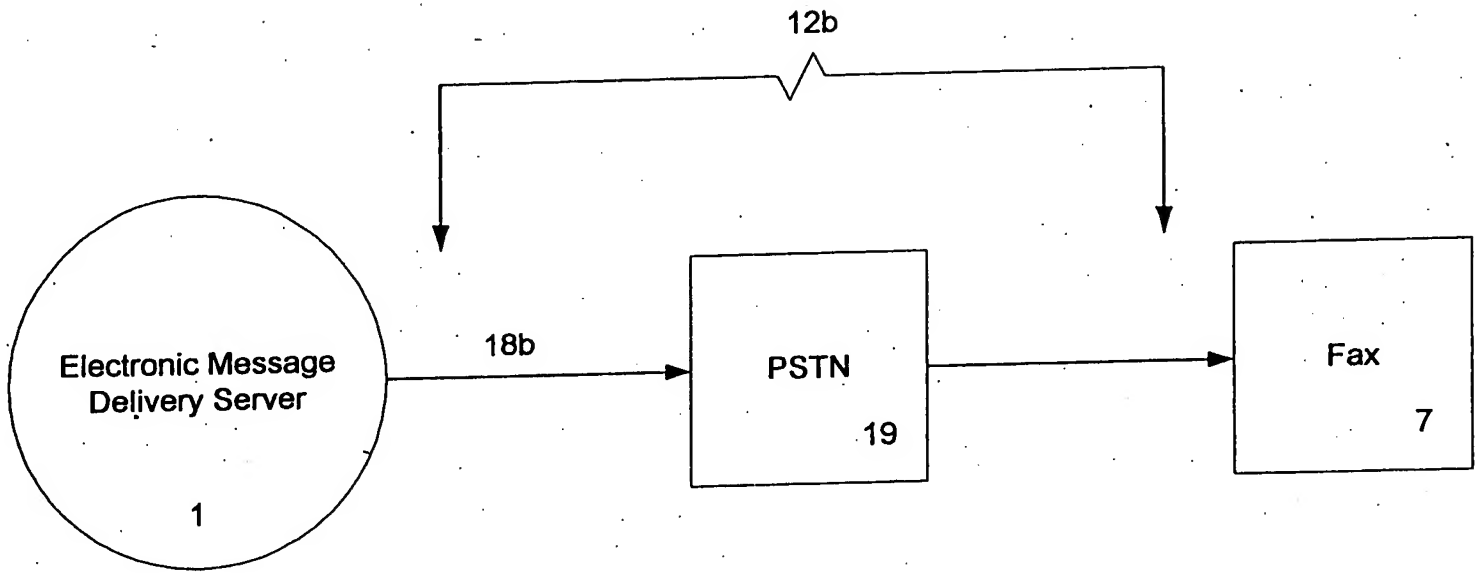

Figure 3b

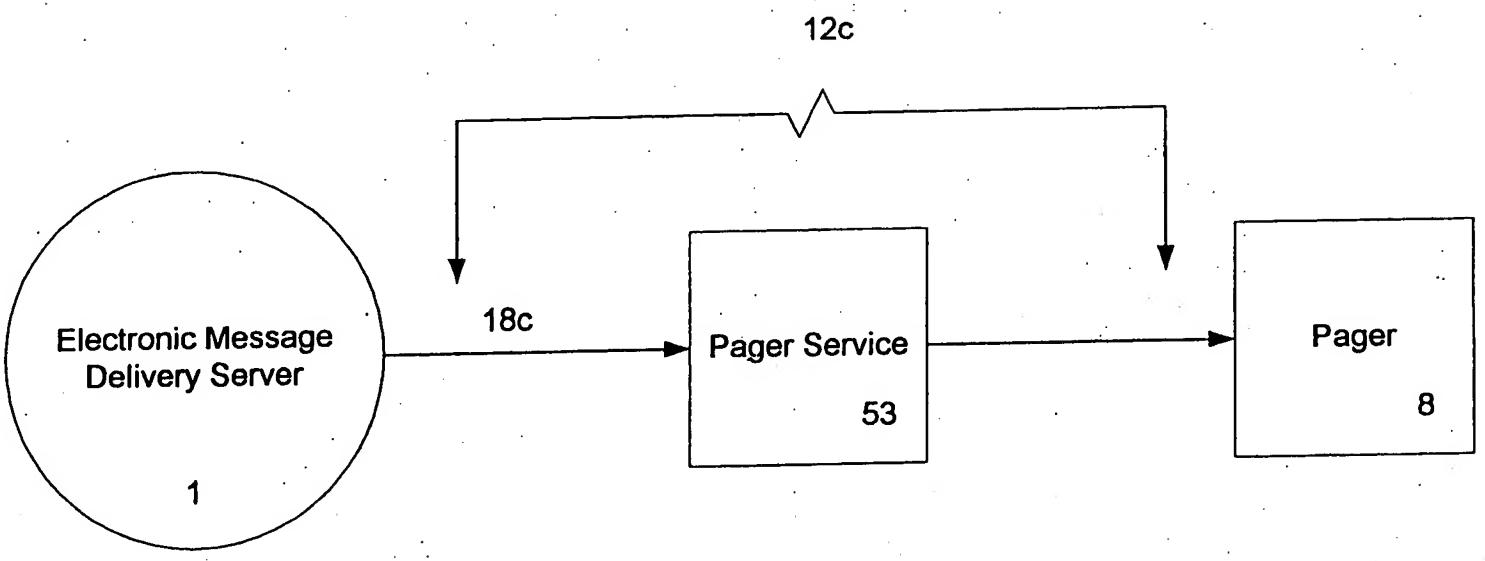
12c
Electronic Message
Delivery Server
1
18c
Pager Service
53
Pager
8

Figure 3c

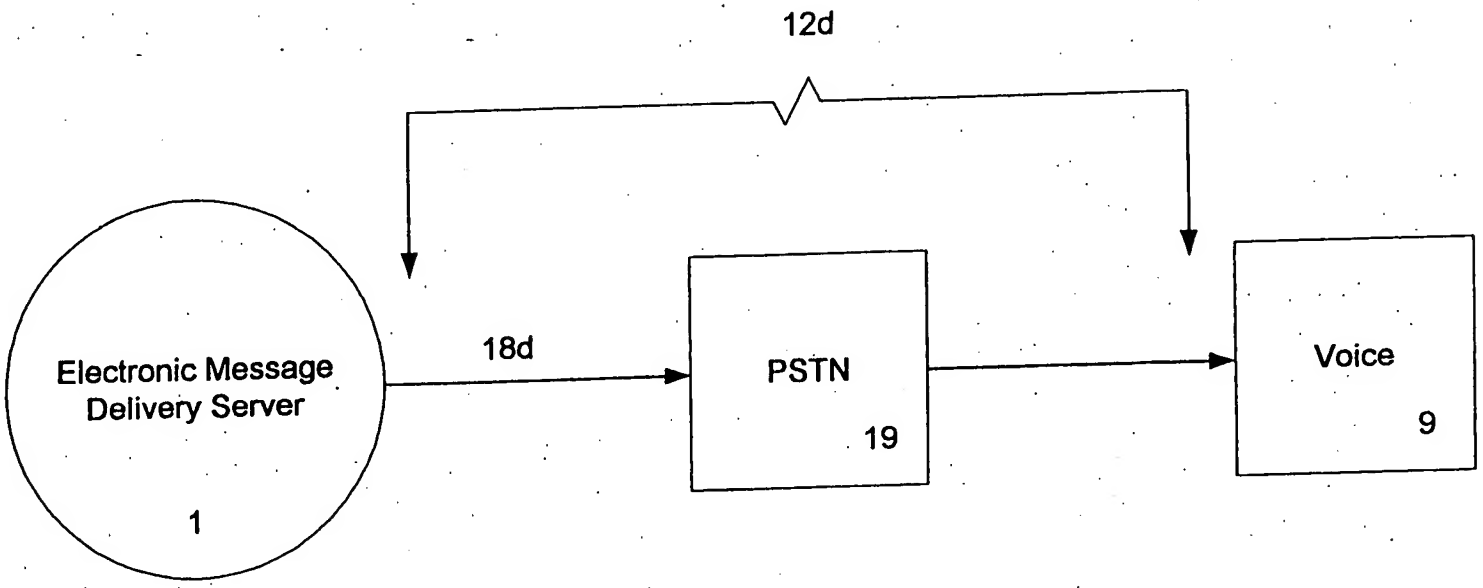
12d
Electronic Message
Delivery Server
1
18d
PSTN
19
Voice
9

Figure 3d

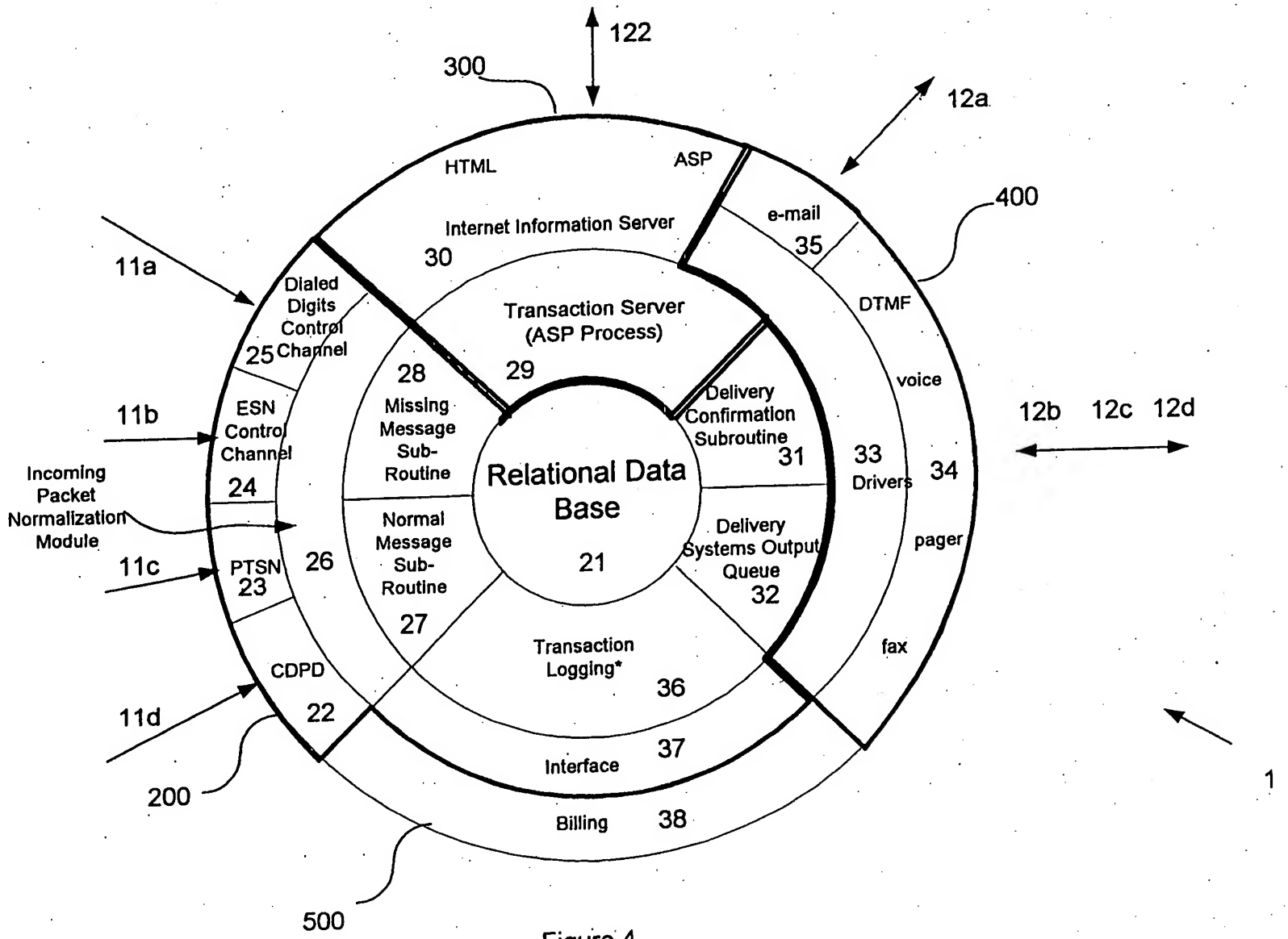
122
300
12a
HTML
ASP
400
e-mail
35
Internet Information Server
30
11a
Dialed Digits Control Channel
25
Transaction Server (ASP Process)
29
DTMF
28
Missing Message Sub-Routine
Delivery Confirmation Subroutine
31
voice
11b
ESN Control Channel
24
12b 12c 12d
Incoming Packet Normalization Module
Relational Data Base
21
33 Drivers
34
Normal Message Sub-Routine
27
Delivery Systems Output Queue
32
pager
11c
PTSN
23
26
CDPD
22
Transaction Logging*
36
fax
11d
37
Interface
200
1
Billing
38
500

Figure 4

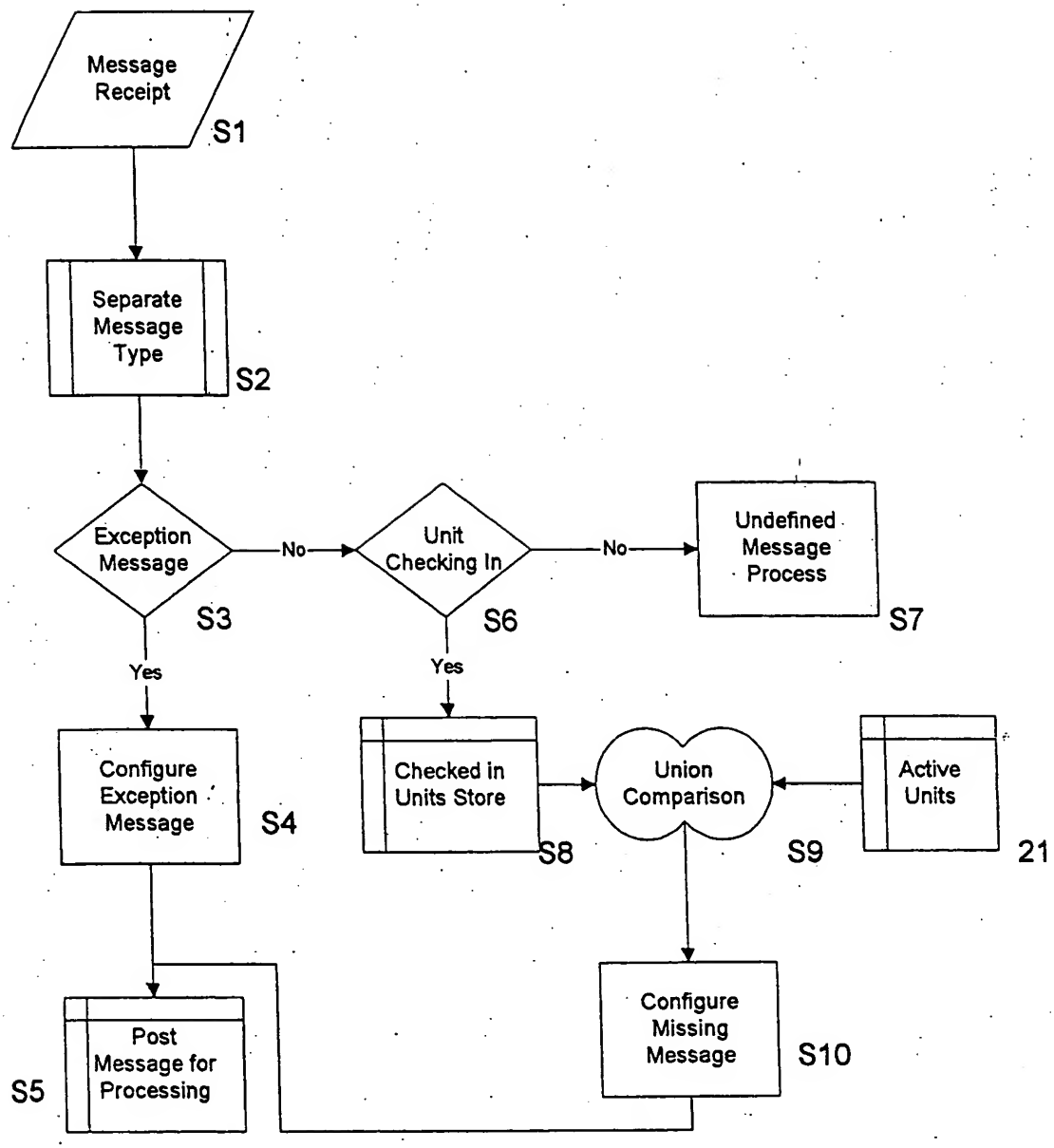
Message Receipt
S1
Separate Message Type
S2
Exception Message
S3
No
Unit Checking In
S6
No
Undefined Message Process
S7
Yes
Yes
Configure Exception Message
S4
Checked in Units Store
S8
Union Comparison
S9
Active Units
21
Post Message for Processing
S5
Configure Missing Message
S10

Figure 5

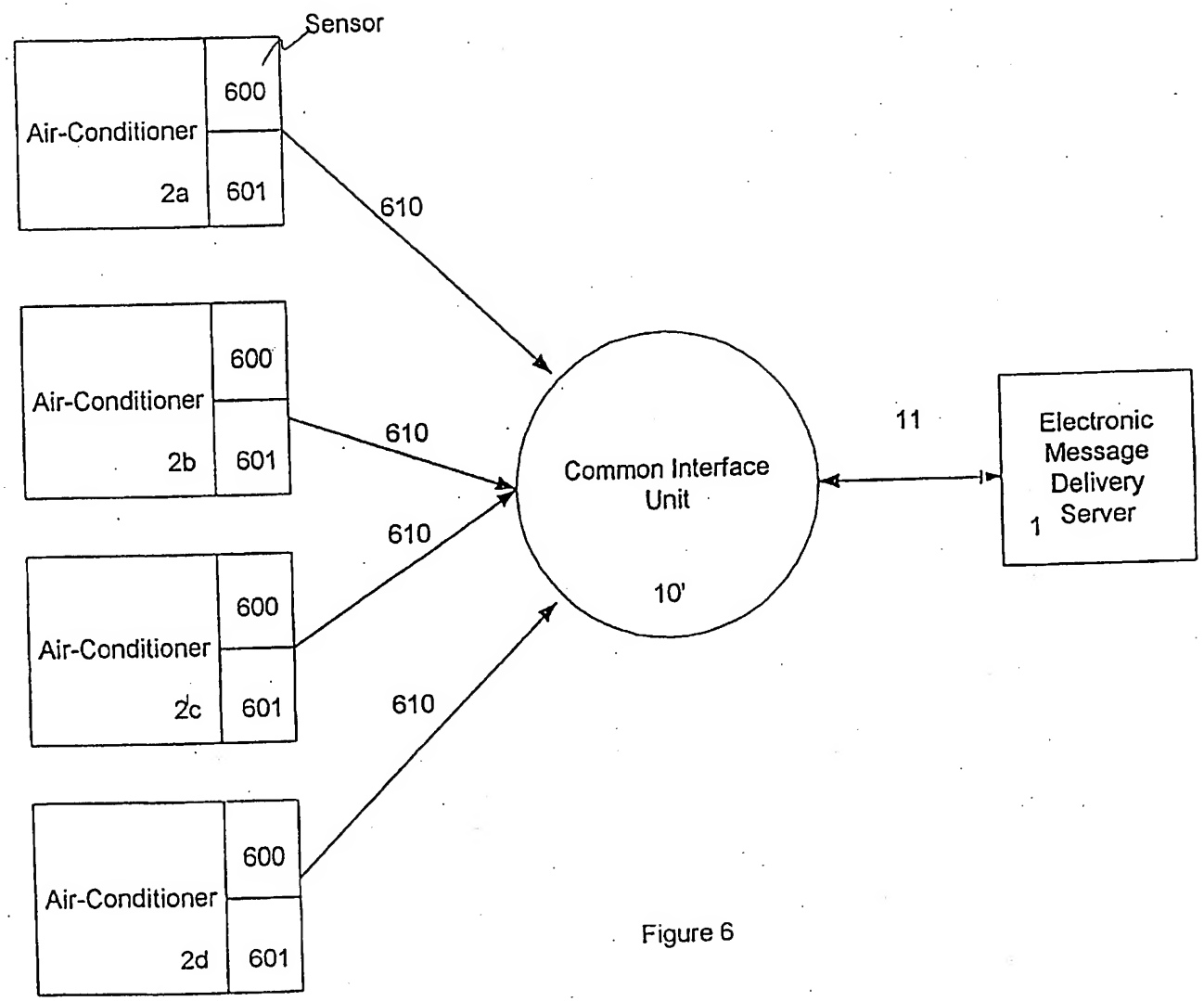
Sensor
600
Air-Conditioner
2a
601
610
600
Air-Conditioner
2b
601
610
610
600
Air-Conditioner
2c
601
610
600
Air-Conditioner
2d
601
Common Interface Unit
10'
11
Electronic Message Delivery Server
1

Figure 6

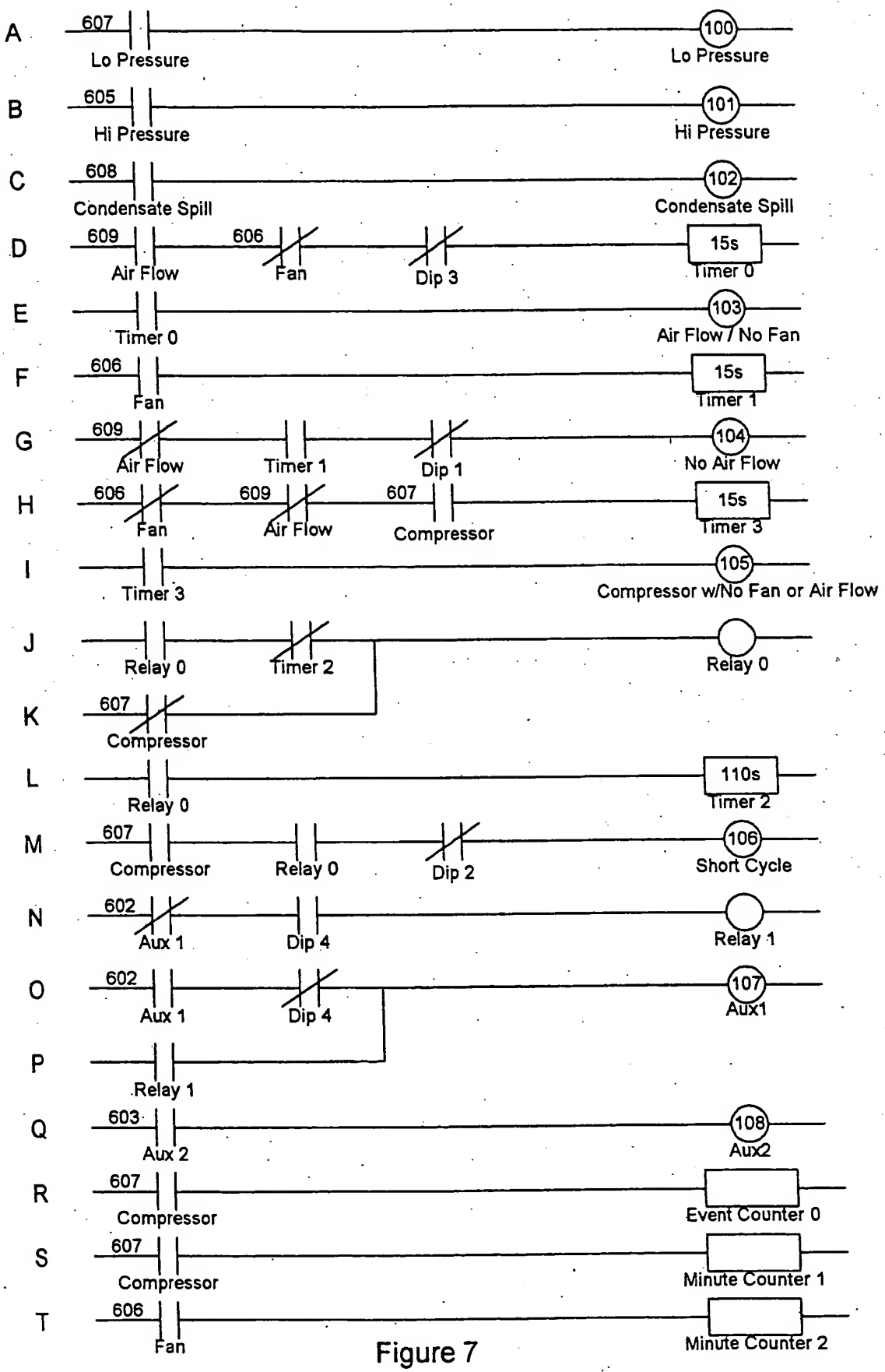
A
607
Lo Pressure
100
Lo Pressure
B
605
Hi Pressure
101
Hi Pressure
C
608
Condensate Spill
102
Condensate Spill
D
609
Air Flow
606
Fan
Dip 3
15s
Timer 0
E
Timer 0
103
Air Flow / No Fan
F
606
Fan
15s
Timer 1
G
609
Air Flow
Timer 1
Dip 1
104
No Air Flow
H
606
Fan
609
Air Flow
607
Compressor
15s
Timer 3
I
Timer 3
105
Compressor w/No Fan or Air Flow
J
Relay 0
Timer 2
Relay 0
K
607
Compressor
L
Relay 0
110s
Timer 2
M
607
Compressor
Relay 0
Dip 2
106
Short Cycle
N
602
Aux 1
Dip 4
Relay 1
O
602
Aux 1
Dip 4
107
Aux1
P
Relay 1
Q
603
Aux 2
108
Aux2
R
607
Compressor
Event Counter 0
S
607
Compressor
Minute Counter 1
T
606
Fan
Minute Counter 2

Figure 7

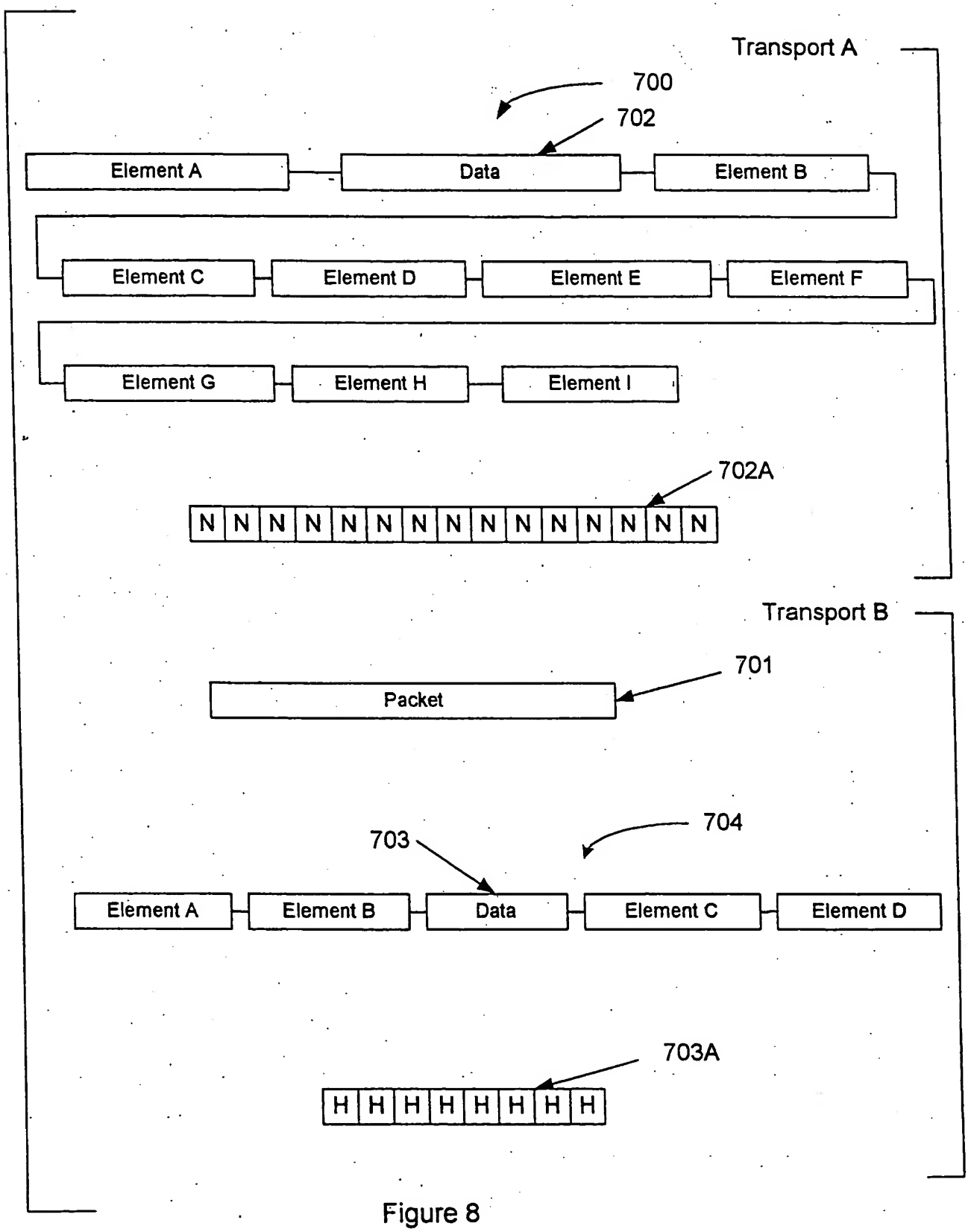
Transport A
700
702
Element A
Data
Element B
Element C
Element D
Element E
Element F
Element G
Element H
Element I
702A
N N N N N N N N N N N N N N
Transport B
701
Packet
704
703
Element A
Element B
Data
Element C
Element D
703A
H H H H H H H H

Figure 8

Incoming Message Table Transport A				705
Key	Element A	Int	nnnn	
	Data	Int	NNN..N	
	Element B	Int	nnnn	
	Element C	Char	$	
	Element D	Char	$$$..$	
	Element E	Char	$$$..$	
	Element F	Int	nnnn	
	Element G	Int	nnnn	
	Element H	Char	$$$..$	
	Element I	Int	nnnn	

Incoming Message Table Transport B				706
Key	Element A	Char	$	
	Element B	Char	$	
	Data	Int	HHH..H	
	Element C	Char	$	
	Element D	Char	$$$..$	

Figure 9

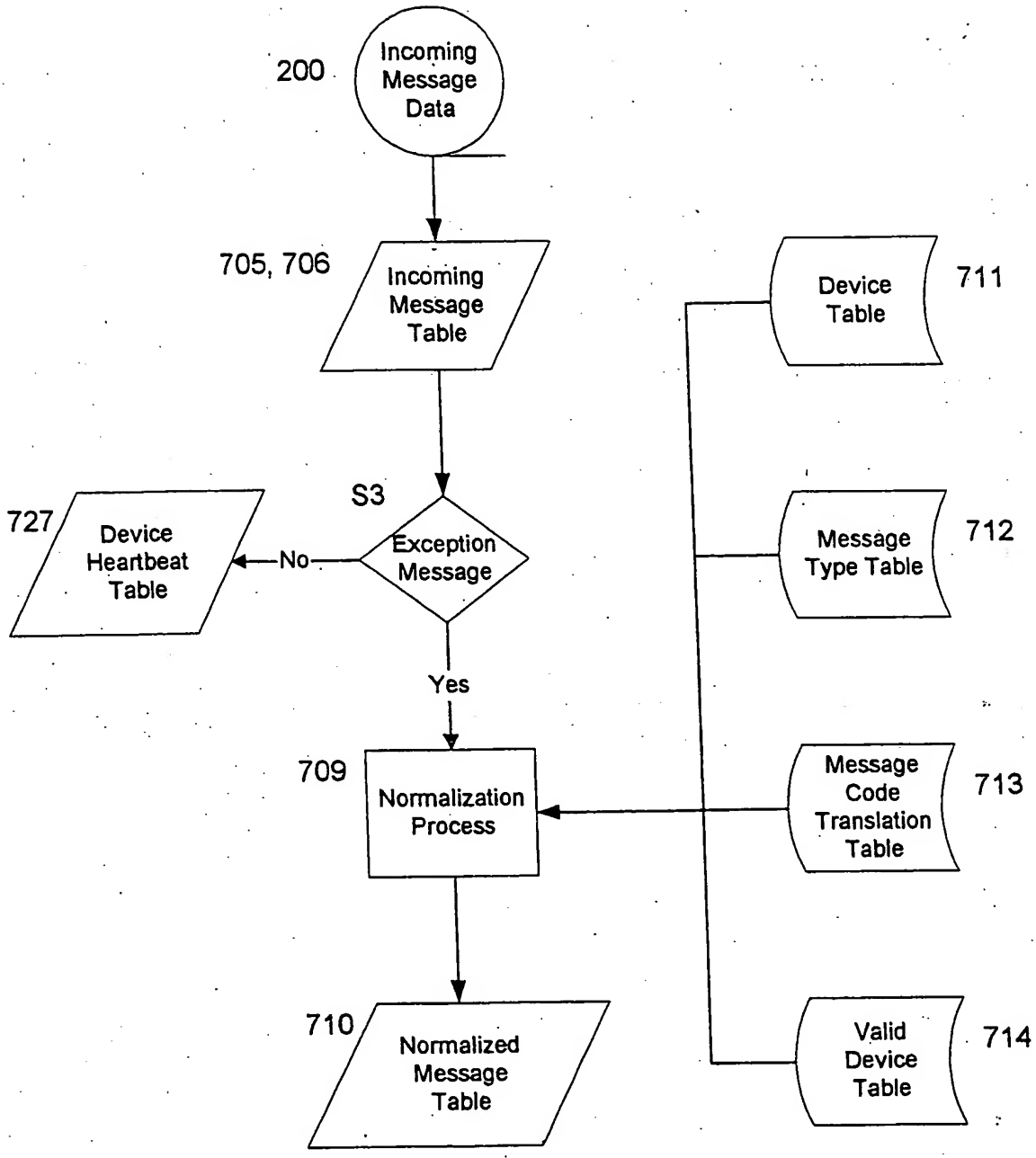
200
Incoming Message Data
705, 706
Incoming Message Table
S3
Exception Message
No
727
Device Heartbeat Table
Yes
709
Normalization Process
710
Normalized Message Table
Device Table
711
Message Type Table
712
Message Code Translation Table
713
Valid Device Table
714

Figure 10

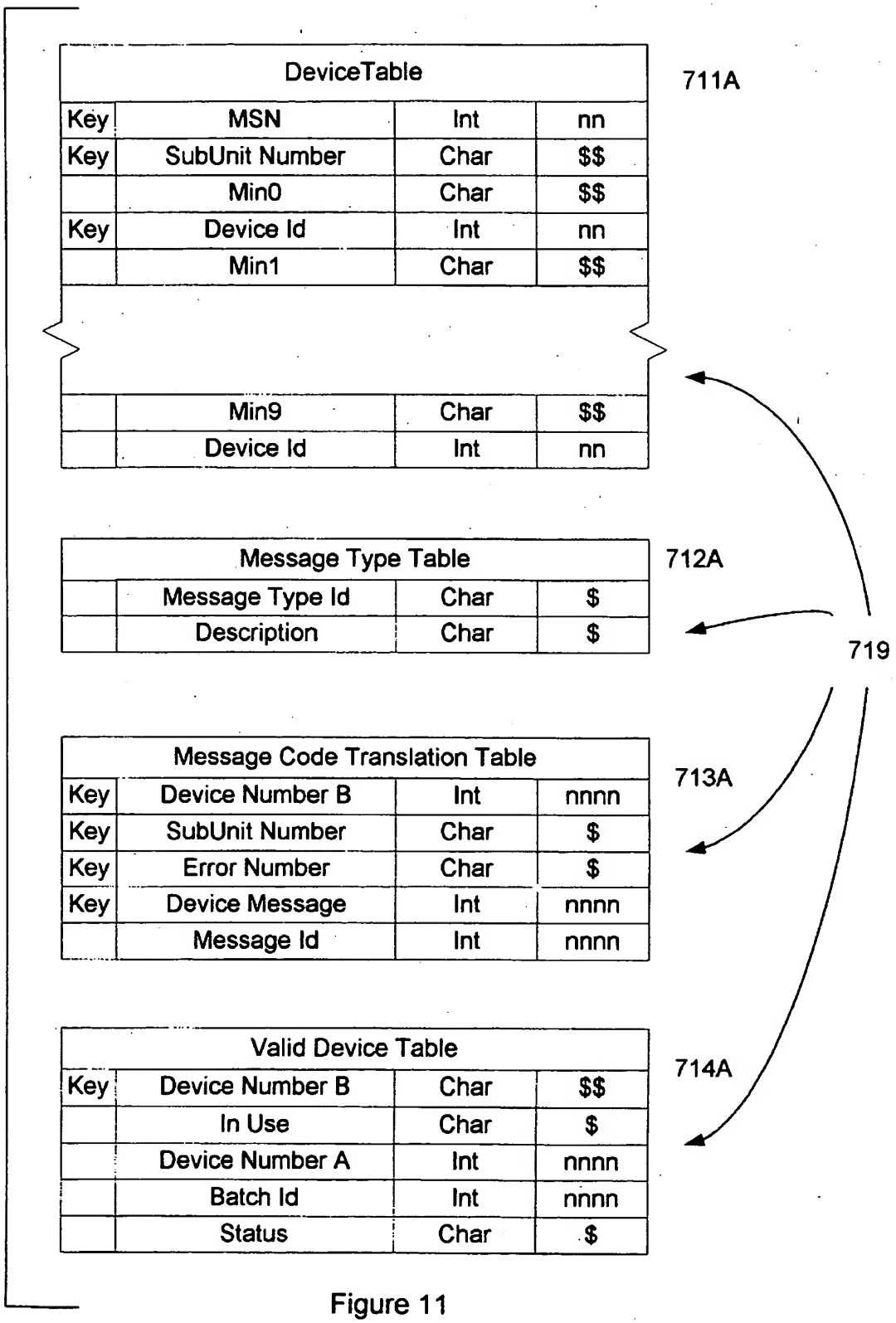
DeviceTable
711A
Key MSN Int nn
Key SubUnit Number Char $$
Min0 Char $$
Key Device Id Int nn
Min1 Char $$
Min9 Char $$
Device Id Int nn
Message Type Table
712A
Message Type Id Char $
Description Char $
719
Message Code Translation Table
713A
Key Device Number B Int nnnn
Key SubUnit Number Char $
Key Error Number Char $
Key Device Message Int nnnn
Message Id Int nnnn
Valid Device Table
714A
Key Device Number B Char $$
In Use Char $
Device Number A Int nnnn
Batch Id Int nnnn
Status Char $

Figure 11

Device Message Delivery			
Key	Message Delivery Id	Int	nnnn
	Message Id	Int	nnnn
	Device Id	Int	nnnn
	In Service	Char	$
	Delivery Attempts	Int	nnnn
	Delivery Method	Char	$$$..$
	Retry Interval	Int	nnnn
	Wait Time	Int	nnnn
	Start Time	Datetime	DD
	End Time	Datetime	DD

720A

Device Location			
Key	Device Location Id	Int	nnnn
	Notifact User Id	Int	nnnn
	Device Id	Int	nnnn
	Installation Date	Datetime	TT:TT
	Retirement Date	Datetime	TT:TT
	Device Location Name	Char	$$$..$
	Gmt Offset	Int	nnnn
	Daylight Savings Time	Char	$$$..$
	Salutation	Char	$$$..$
	First Name	Char	$$$..$
	Middle Initial	Char	$$$..$
	Last Name	Char	$$$..$
	Gender	Char	$$$..$
	Phone	Char	$$$..$
	Extension	Char	$$$..$
	Address 1	Char	$$$..$
	Address 2	Char	$$$..$
	City	Char	$$$..$
	State	Char	$$$..$
	Zip	Char	$$$..$
	Manufacturer	Char	$$$..$
	Model	Char	$$$..$
	Serial Number	Char	$$$..$
	Name	Char	$$$..$

721A

Figure 12

Fax Delivery			
Key	Message Delivery Id	Int	nnnn
	Fax Number	Char	$$$..$
	To Name	Char	$$$..$
	From Name	Char	$$$..$
	Message Text	Char	$$$..$
	Subject	Char	$$$..$

722A

Modem Delivery			
Key	Message Delivery Id	Int	nnnn
	Modem Address	Char	$$$..$
	Message Text	Char	$$$..$
	Subject	Char	$$$..$

723A

Pager Delivery			
Key	Message Delivery Id	Int	nnnn
	Phone Number	Char	$$$..$
	Dialed Digits	Char	$$$..$
	Message Text	Char	$$$..$

724A

Phone Delivery			
Key	Message Delivery Id	Int	nnnn
	Phone Number	Char	$$$..$
	Voice Message File	Char	$$$..$
	Message Text	Char	$$$..$

725A

Figure 13

Delivery Attempt			
Key	Delivery Attempt Id	Int	nnnn
	Message Delivery Id	Int	nnnn
	Device Message Id	Int	nnnn
	Attempt Result	Char	$$$..$
	Delivery Attempt Dt	Datetime	TT:TT
	Attempt Number	Int	nnnn
	Wait Time	Int	nnnn
	Binary File	Char	$$$..$
	Attempt Finish	Datetime	TT:TT
	Result Text	Char	$$$..$

726A

Device Heartbeat			
Key	Device Hb Id	Int	nnnn
	Hb Transport	Char	$$$..$
	Hb Data	Char	$$$..$
	Device Id	Int	nnnn
	Device Location Id	Int	nnnn
	Hb Date	Datetime	TT:TT

727A

Device Message			
Key	Device Message Id	Int	nnnn
	Message Id	Int	nnnn
	Device Id	Int	nnnn
	Device Message DT	Datetime	TT:TT
	Device Location Id	Int	nnnn

728

Normalized Message			
	Message Delivery Id	Int	nnnn
Key	Message Queue Id	Int	nnnn
	Status	Char	$
	Device Message Id	Int	nnnn
	Next Attempt	Datetime	TT:TT

710A

Figure 14

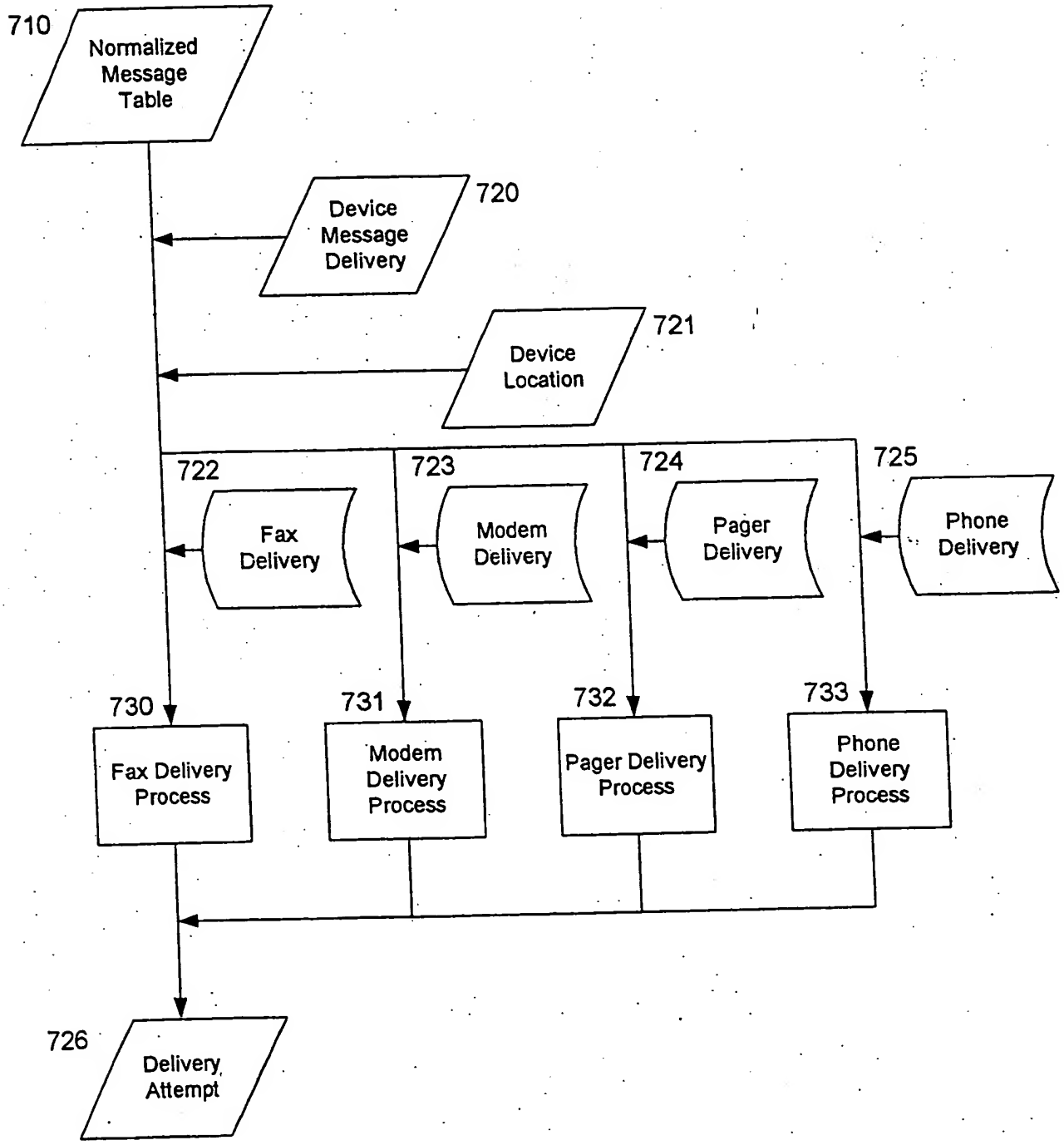
710
Normalized Message Table
720
Device Message Delivery
721
Device Location
722
Fax Delivery
723
Modem Delivery
724
Pager Delivery
725
Phone Delivery
730
Fax Delivery Process
731
Modem Delivery Process
732
Pager Delivery Process
733
Phone Delivery Process
726
Delivery Attempt

Figure 15

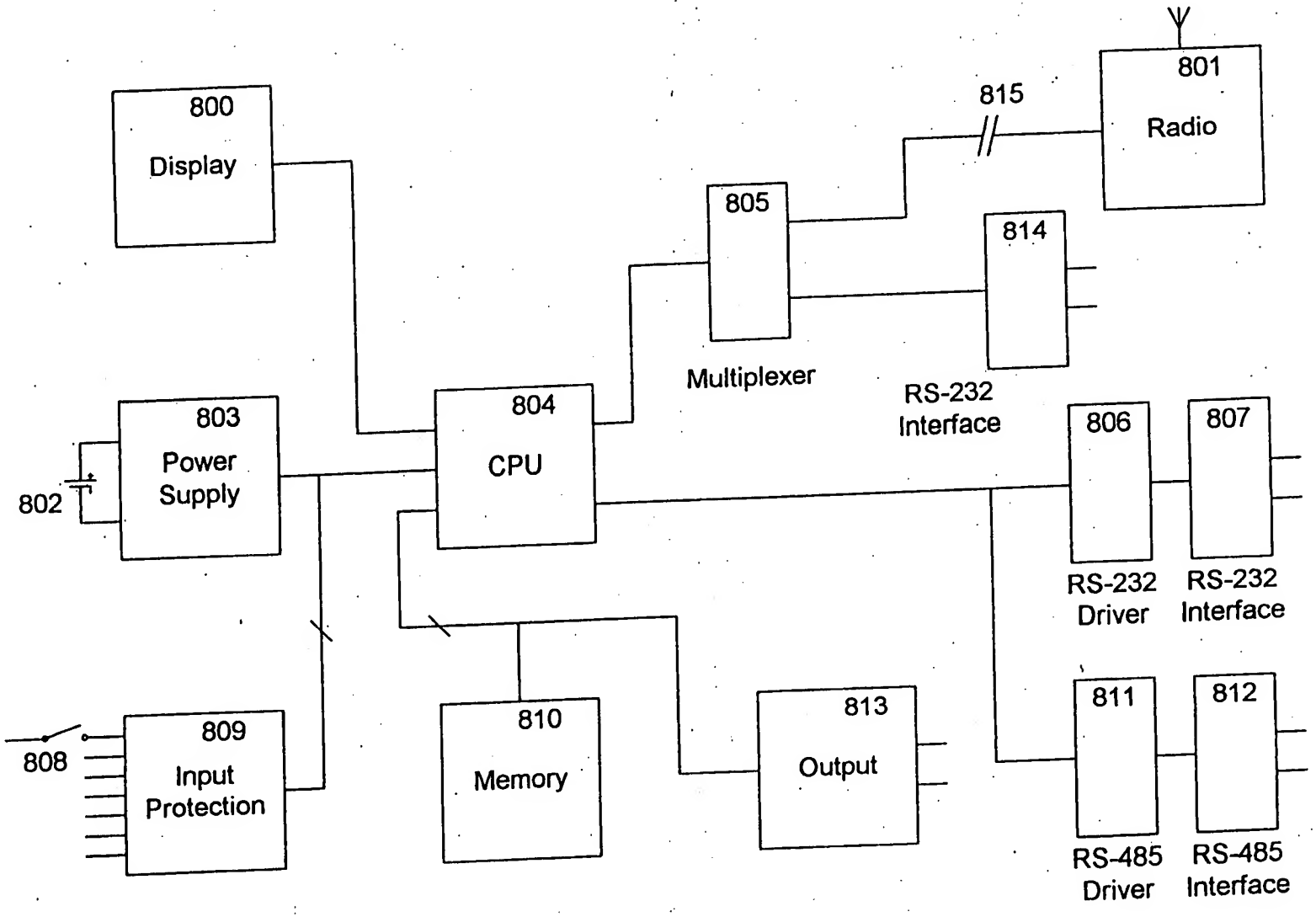
800
Display
801
Radio
815
805
Multiplexer
814
RS-232
Interface
803
Power
Supply
802
804
CPU
806
RS-232
Driver
807
RS-232
Interface
809
Input
Protection
808
810
Memory
813
Output
811
RS-485
Driver
812
RS-485
Interface

Figure 16

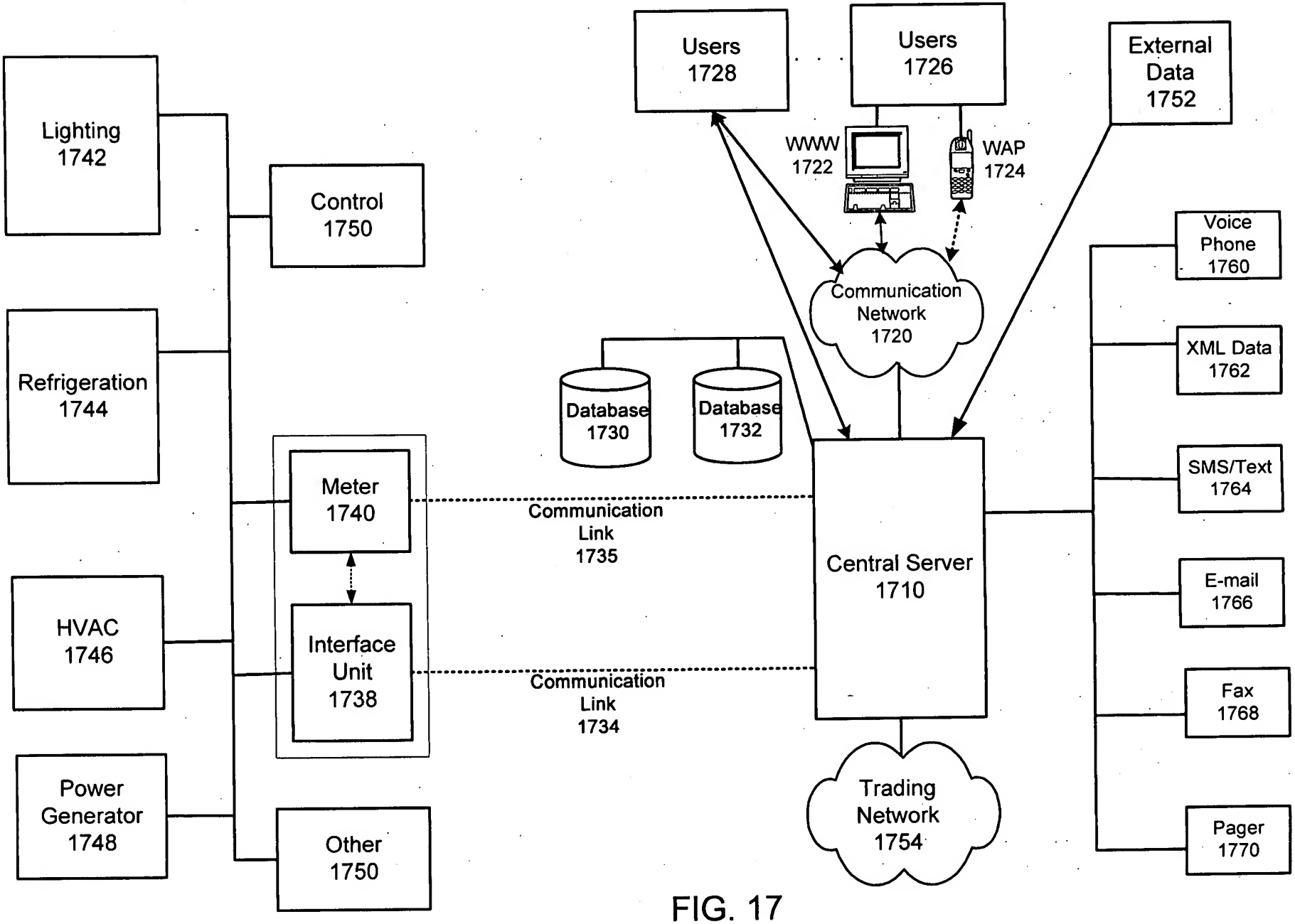
Lighting
1742
Control
1750
Refrigeration
1744
Meter
1740
HVAC
1746
Interface
Unit
1738
Power
Generator
1748
Other
1750
Users
1728
Users
1726
External
Data
1752
WWW
1722
WAP
1724
Communication
Network
1720
Database
1730
Database
1732
Communication
Link
1735
Communication
Link
1734
Central Server
1710
Trading
Network
1754
Voice
Phone
1760
XML Data
1762
SMS/Text
1764
E-mail
1766
Fax
1768
Pager
1770

FIG. 17

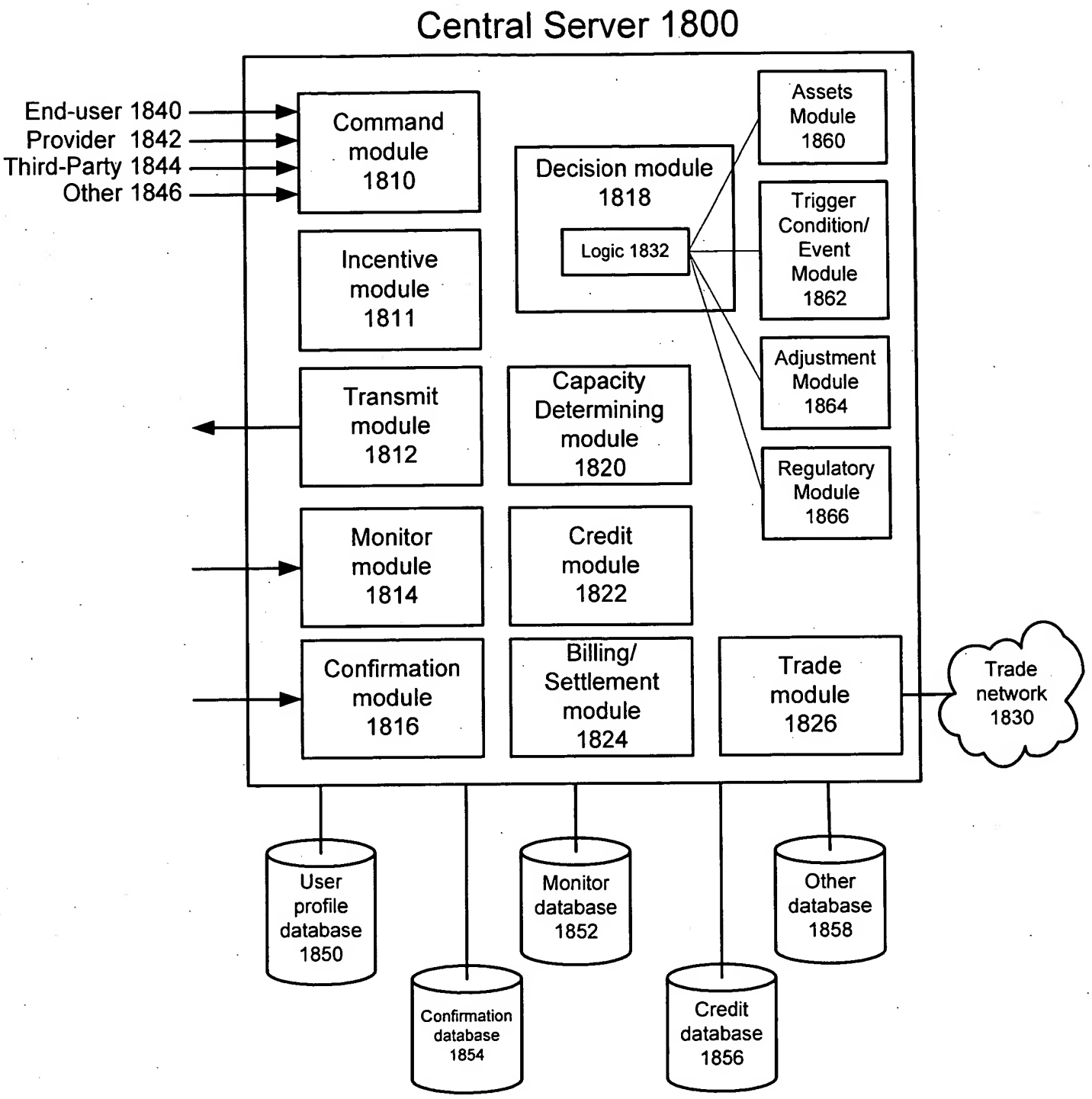
Central Server 1800
End-user 1840
Provider 1842
Third-Party 1844
Other 1846
Command module 1810
Incentive module 1811
Transmit module 1812
Monitor module 1814
Confirmation module 1816
Decision module 1818
Logic 1832
Capacity Determining module 1820
Credit module 1822
Billing/ Settlement module 1824
Trade module 1826
Assets Module 1860
Trigger Condition/ Event Module 1862
Adjustment Module 1864
Regulatory Module 1866
Trade network 1830
User profile database 1850
Confirmation database 1854
Monitor database 1852
Credit database 1856
Other database 1858

FIG. 18

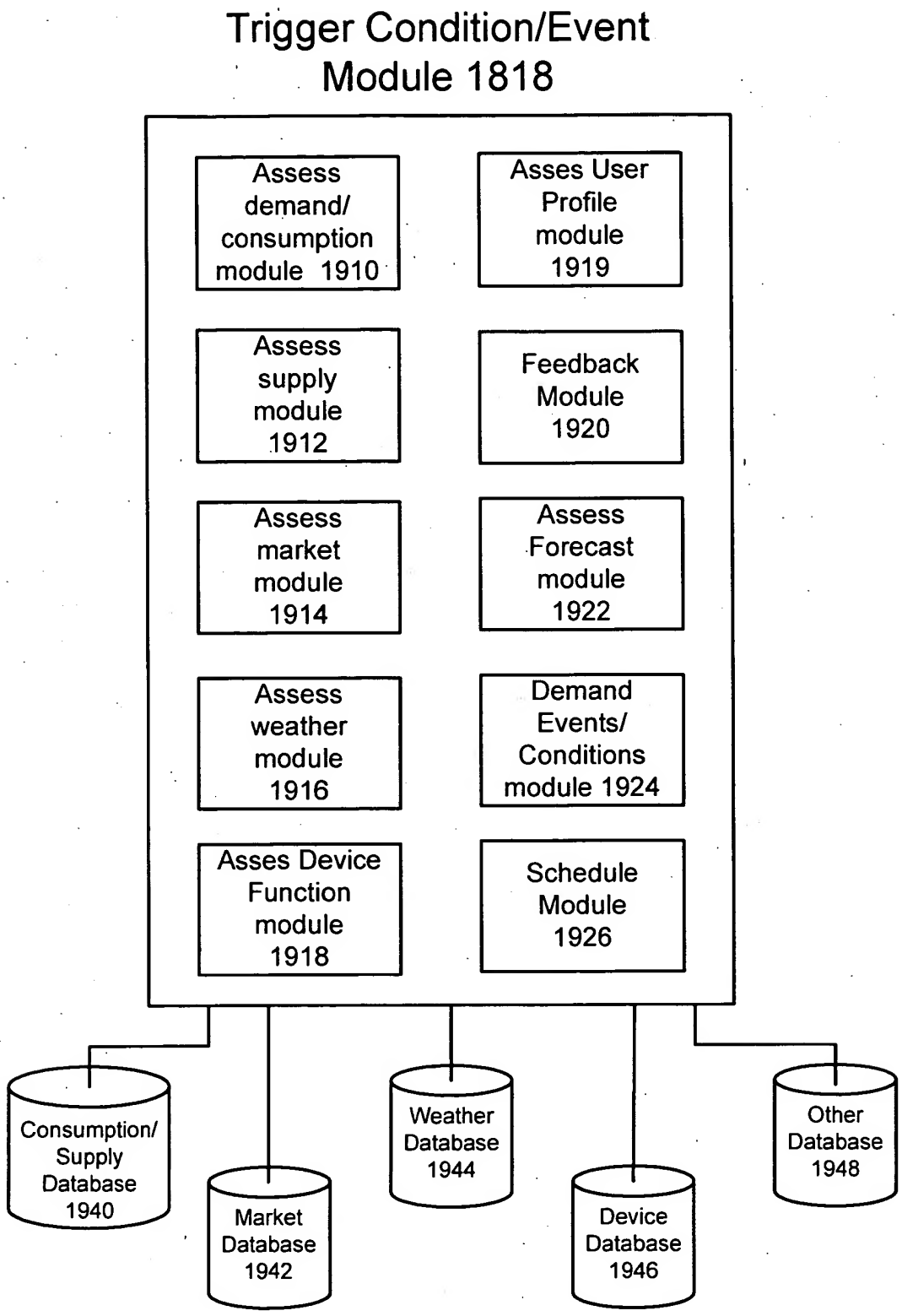
Trigger Condition/Event Module 1818
Assess demand/ consumption module 1910
Asses User Profile module 1919
Assess supply module 1912
Feedback Module 1920
Assess market module 1914
Assess Forecast module 1922
Assess weather module 1916
Demand Events/ Conditions module 1924
Asses Device Function module 1918
Schedule Module 1926
Consumption/ Supply Database 1940
Market Database 1942
Weather Database 1944
Device Database 1946
Other Database 1948

FIG. 19

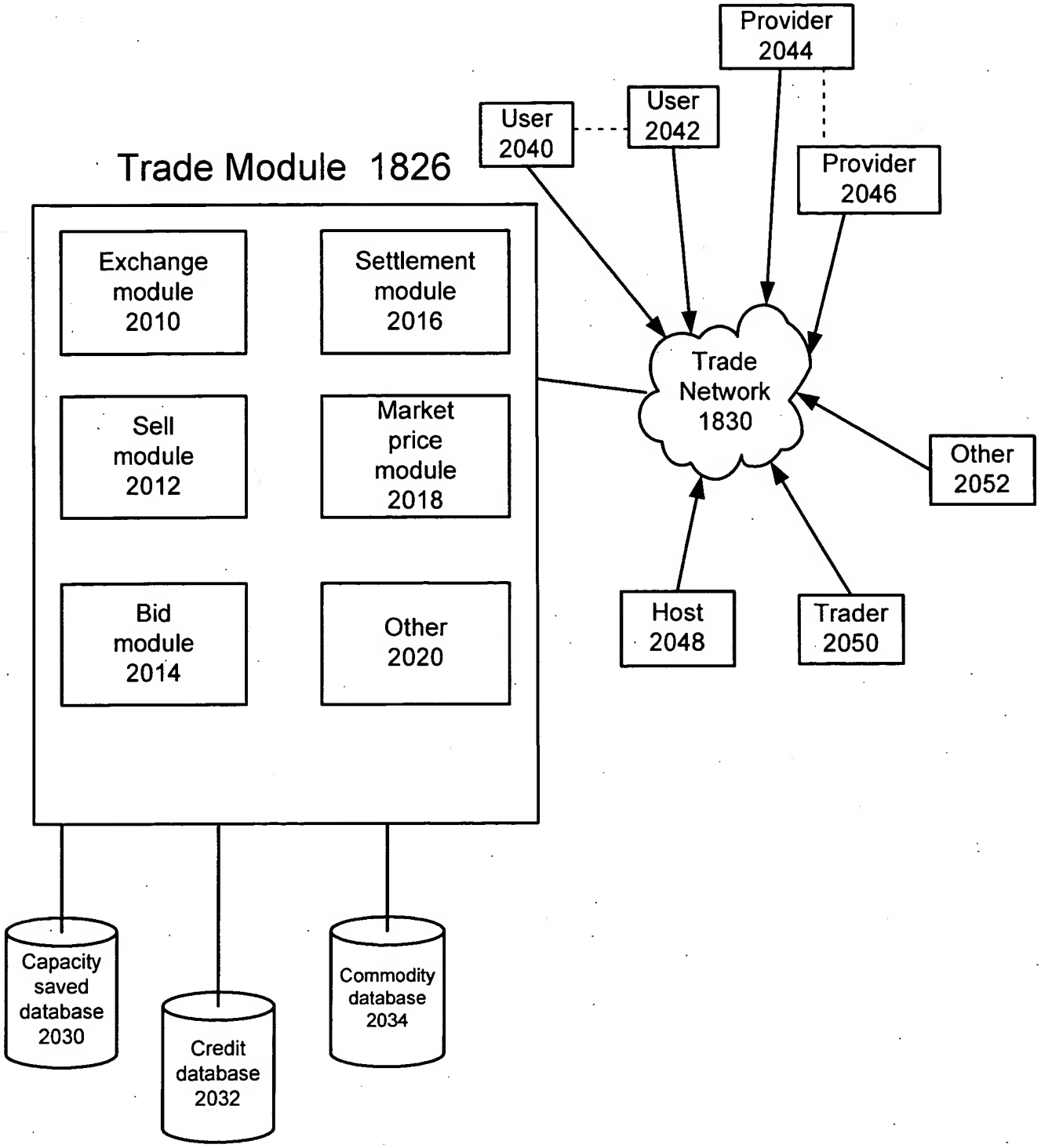
Provider
2044
User
2040
User
2042
Provider
2046
Trade Module 1826
Exchange
module
2010
Settlement
module
2016
Trade
Network
1830
Sell
module
2012
Market
price
module
2018
Other
2052
Bid
module
2014
Other
2020
Host
2048
Trader
2050
Capacity
saved
database
2030
Credit
database
2032
Commodity
database
2034

FIG. 20

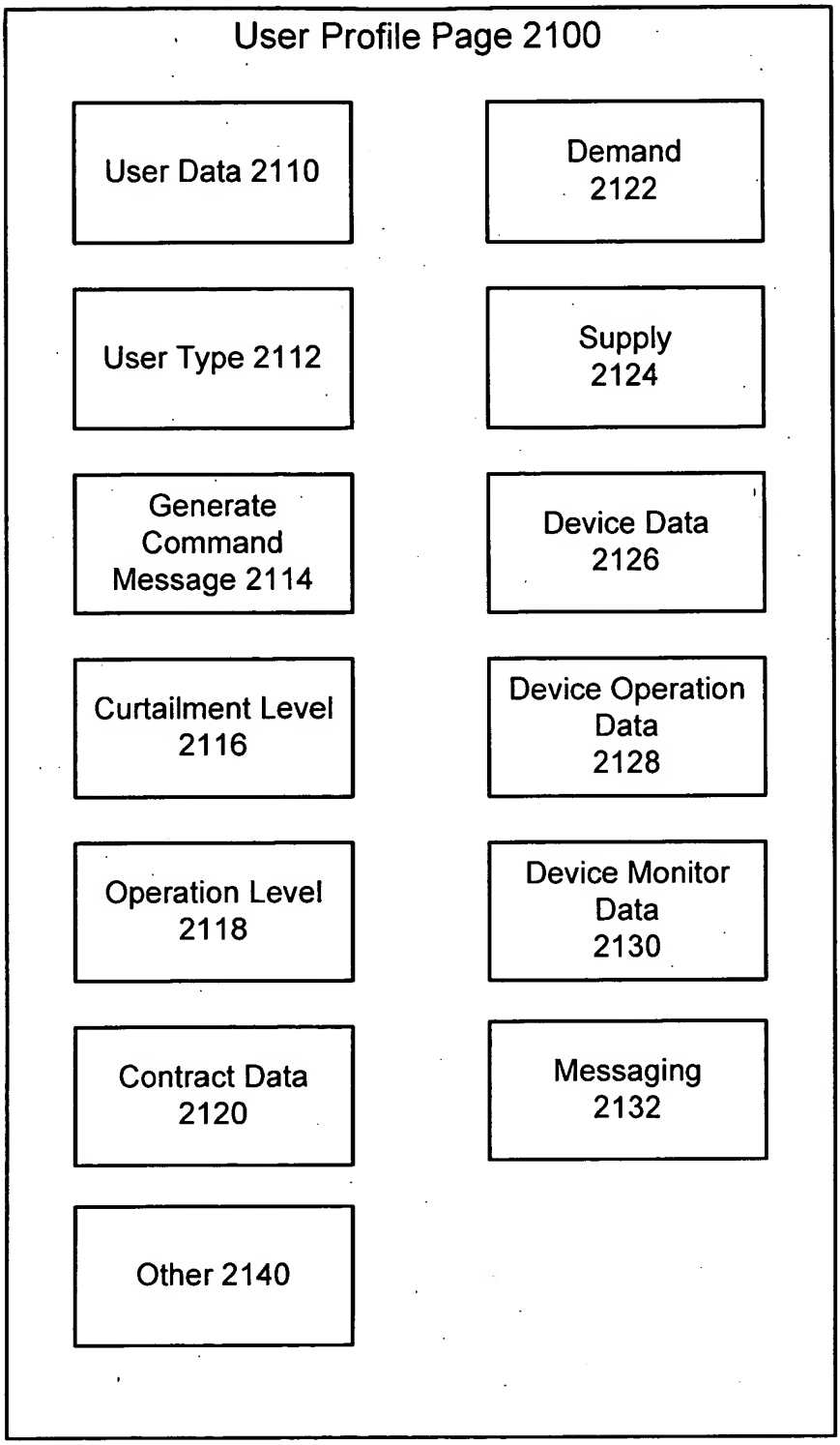
User Profile Page 2100
User Data 2110
Demand 2122
User Type 2112
Supply 2124
Generate Command Message 2114
Device Data 2126
Curtailment Level 2116
Device Operation Data 2128
Operation Level 2118
Device Monitor Data 2130
Contract Data 2120
Messaging 2132
Other 2140

FIG. 21

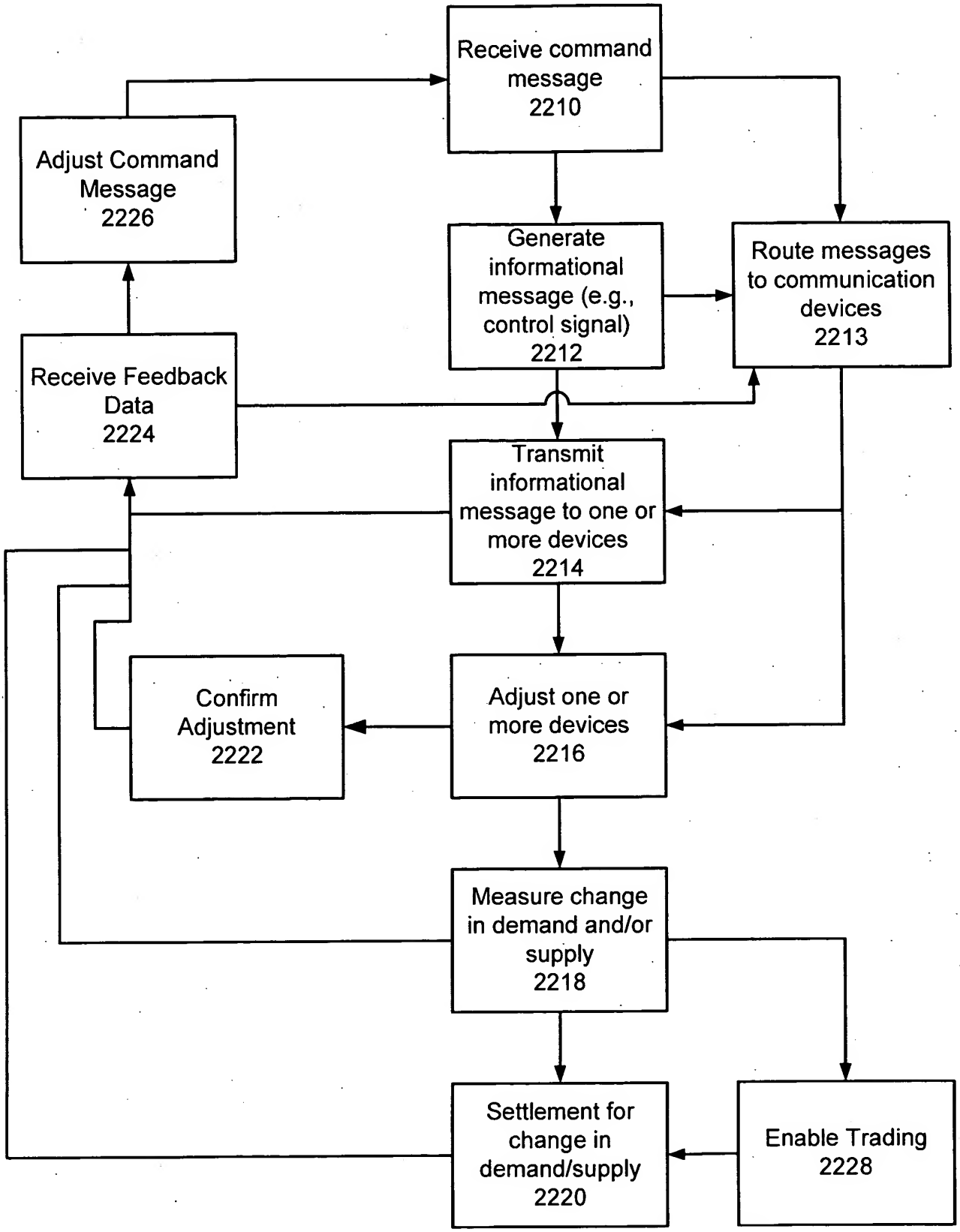
Receive command message 2210
Adjust Command Message 2226
Generate informational message (e.g., control signal) 2212
Route messages to communication devices 2213
Receive Feedback Data 2224
Transmit informational message to one or more devices 2214
Confirm Adjustment 2222
Adjust one or more devices 2216
Measure change in demand and/or supply 2218
Settlement for change in demand/supply 2220
Enable Trading 2228

FIG. 22

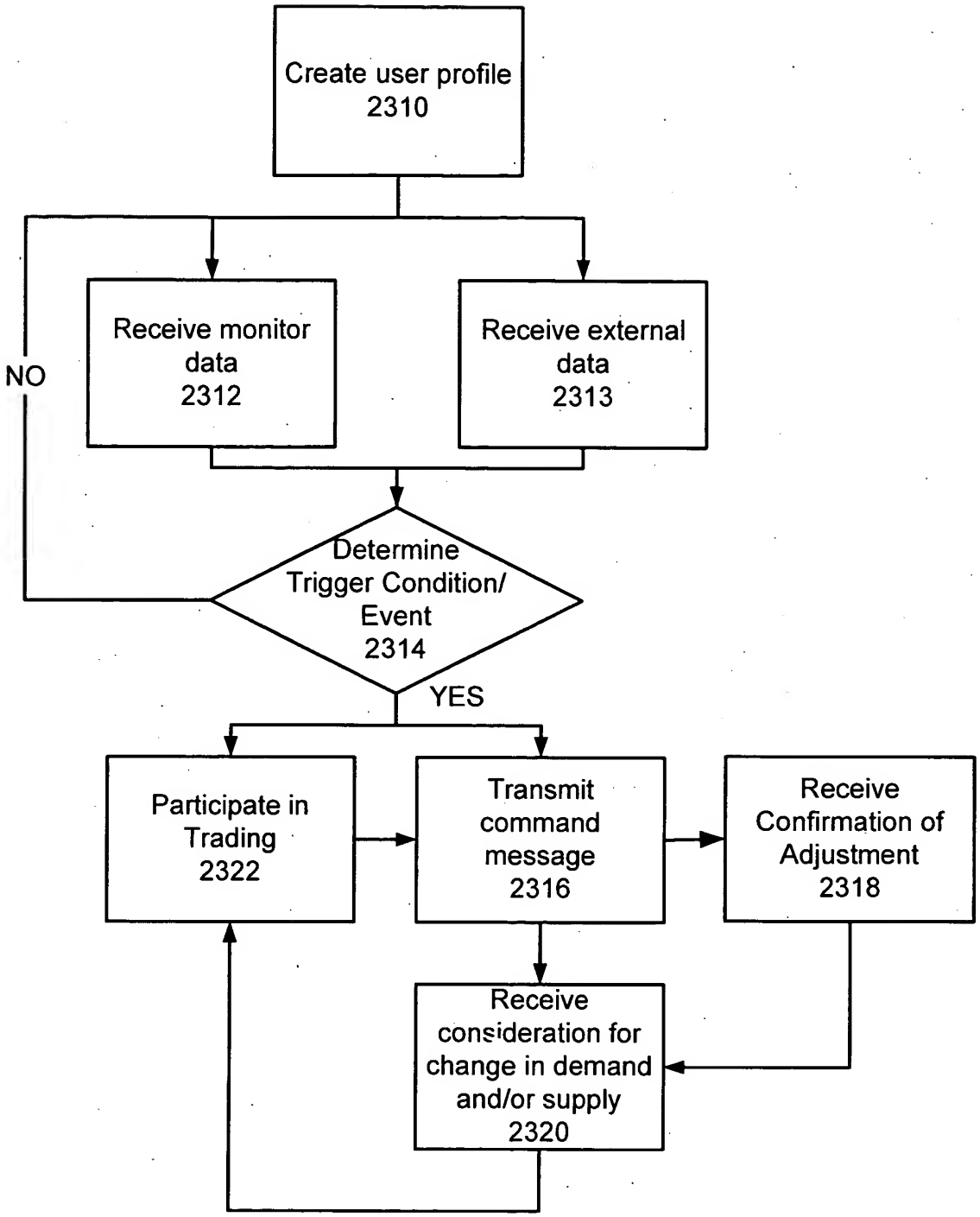
Create user profile
2310
Receive monitor data
2312
Receive external data
2313
NO
Determine Trigger Condition/ Event
2314
YES
Participate in Trading
2322
Transmit command message
2316
Receive Confirmation of Adjustment
2318
Receive consideration for change in demand and/or supply
2320

FIG. 23

Sample Curtailment Log: 2410

Location:	Customer Name and Location
Equipment:	Manufacturer: Model: Serial Number: Group Name: Equipment Name:
Contact:	Name: Phone:

Sample of System Messages Generated 2420

Message ID	Message Date	Message Description
19863	10/29/00 17:41:20	Energy Curtailment completed. Case Lights should turn back on at 6:00 pm. Notify Maintenance should you experience any problems.
19862	10/29/00 13:31:21	Energy Curtailment to begin at 2 pm. Please notify your customers that case lights will shut off until 6:00 pm
19862	10/26/00 15:55:32	*Curtailment Initiated

Sample from Message Delivery Confirmation Log 2424

Delivery Method	ID	Result	Delivery Address	Delivery Time
E-MAIL	62405	DELIVERED	jim@customer.com	10/29/00 17:44:25
E-MAIL	62406	DELIVERED	dave@control.com	10/29/00 17:44:26
PHONE	62652	DELIVERED	1(800) 555-5555	10/29/00 18:36:12

FIG. 24

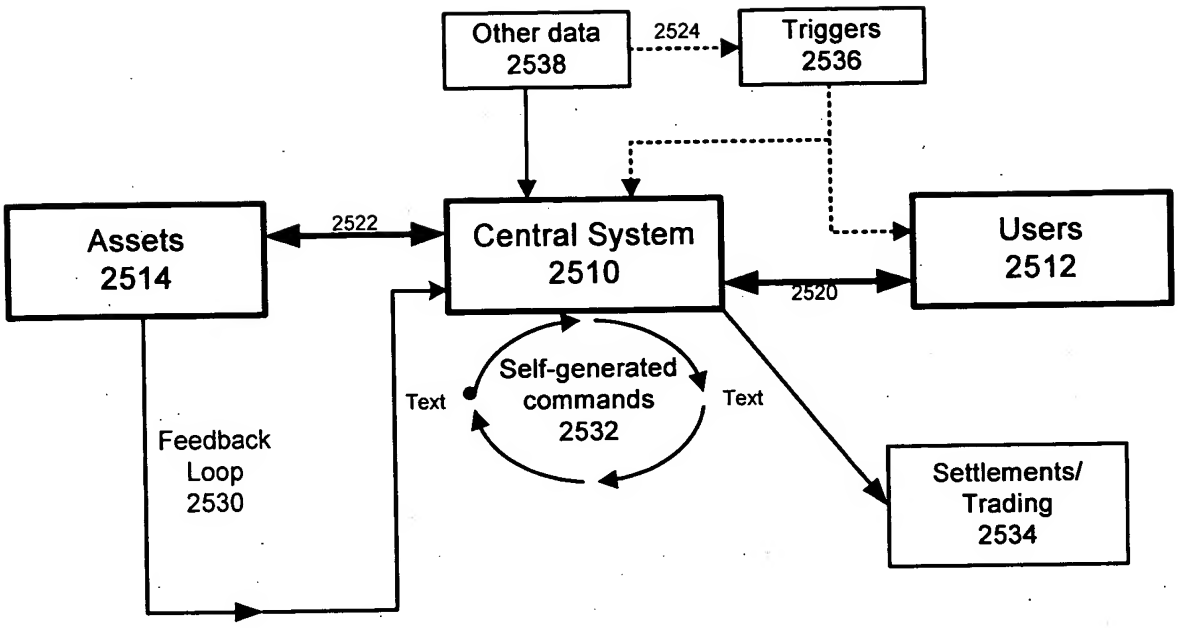
Other data
2538
2524
Triggers
2536
Assets
2514
2522
Central System
2510
Users
2512
2520
Self-generated
commands
2532
Text
Text
Feedback
Loop
2530
Settlements/
Trading
2534

FIG. 25